

# Nucleosynthesis

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15 February 2006

## Abstract

Abundance observations indicate the presence of neutron capture (*i.e.*, *s*- and *r*-process) elements in old Galactic halo and globular cluster stars. These observations provide insight into the nature of the earliest generations of stars in the Galaxy – the progenitors of the halo stars – responsible for neutron-capture synthesis. Comparisons of abundance trends can be used to understand the chemical evolution of the Galaxy and the nature of heavy element nucleosynthesis. In addition age determinations, based upon long-lived radioactive nuclei abundances, can now be obtained. These stellar abundance determinations depend critically upon atomic data. Improved laboratory transition probabilities have been recently obtained for a number of elements. These new *gf* values have been used to greatly refine the solar photospheric abundances of, especially, rare-earth elements, and has allowed for more reliable determinations of the abundances in metal-poor Galactic halo stars. These newly determined stellar abundances are consistent with a (relative) Solar System *r*-process pattern, and are also consistent with abundance predictions expected from such neutron-capture nucleosynthesis.

This work has been supported in part by NSF and by STScI.

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